

## Geometry Learning Goals

### Geometry Essential Learning Goals

**1.0** Students demonstrate understanding by identifying and giving examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.

**2.0** Students write geometric proofs, including proofs by contradiction.

**3.0** Students construct and judge the validity of a logical argument and give counterexamples to disprove a statement.

**4.0** Students prove basic theorems involving congruence and similarity.

**5.0** Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.

**6.0** Students know and are able to use the triangle inequality theorem.

**7.0** Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.

**8.0** Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.

**9.0** Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.

**10.0** Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.

**11.0** Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.

**12.0** Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.

**13.0** Students prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.

**15.0** Students use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.

**16.0** Students perform basic constructions with a straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line.

**18.0, 19.0** Students know the definitions of the basic trigonometric functions defined by the angles of a right triangle and can use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.

**20.0** Students know and are able to use angle and side relationships in problems with special right triangles, such as  $30^\circ$ ,  $60^\circ$ , and  $90^\circ$  triangles and  $45^\circ$ ,  $45^\circ$ , and  $90^\circ$  triangles.

**21.0** Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.

**22.0** Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.